

RESEARCH NEEDS FOR THE SCREW-WORM ERADICATION PROGRAM

A. Animal Protection (Kerrville)

This subject was discussed on pages 47 and 48 of the Entomology Research Division report dated March 22, 1957, and entitled "Operational Procedures and Estimated Requirements in the Conduct of a Screw-worm Eradication Program in the Southeastern United States." Special attention was called to encouraging results with Bayer 21/199 and it was suggested, if \$50,000 could be made available to the Kerrville laboratory to cover extra expenses for intensified research, that Kerrville could develop a livestock protectant spray by the end of fiscal year 1958.

In anticipation of an eradication program, the Kerrville laboratory diverted activities from some of its other projects and concentrated efforts to field-test 21/199 during the past summer. A total of 11,067 sheep with shear-cuts, 408 sheep and goats with other wounds, 515 head of screw-worm-infested cattle and 3 horses were treated with sprays in comparison with the standard EQ 335. The results showed that 0.5 percent 21/199 spray was far superior to the presently recommended EQ 335. In general, most sprayed animals healed without further infestation and those that became infested had been protected 10 days or longer. There were only a few cases of less than 10 days protection and these were associated with new, bloody wounds on previously sprayed animals.

Some work has been done on incorporating 21/199 in a wound dressing similar to EQ 335. Formulations studies will be completed this fall and winter to develop emuls for field tests next spring. Since as much as 3 percent of 21/199 may be incorporated in a smear for wound treatment, it should protect that limited area better than a 0.5 percent spray applied over the entire body.

The research has indicated that routine spraying of susceptible livestock will protect animals from infestation. Further experiments have to be made to determine the frequency of spraying required. When a protective spray treatment is developed it should be of value if used by Florida ranchers to prevent breeding in sprayed herds and thus limit the native fly population to that breeding in neglected stock and wild animals.

Toxicological research has indicated the safety of single sprays and data from chemical and radiocentric studies show that

single treatments do not constitute a residue hazard. However, toxicity and residue studies have not yet been made to determine the effects of repeated treatments with 21/199. Before repeated applications of 21/199 treatments can be recommended, we must have data to show that they are harmless to livestock and do not cause a meat residue hazard. These chemical and toxicological studies should not be difficult because the Kerrville laboratory is already equipped and staffed and the results with single treatments suggest that repeated treatments should prove safe.

It is proposed that research on animal protectant treatments be conducted in Texas to perfect formulations, establish entomological efficiency, toxicological safety and lack of residue hazard. Final field tests to check performance under Florida conditions would be made by Kerrville entomologists on temporary assignment in Florida.

If the salaries released by transfer of present screw-worm research employees to Animal Disease Eradication Division can all be utilized at Kerrville, the research can be conducted on schedule. The proposed organization and estimated expenses for these investigations are shown in the following tabulation:

SCHEM-WORM RESEARCH

Animal Protectors--Kerrville

Duchland, E. C.	GS-13 Entomologist (quarter-time)	\$ 2,500
Brundrett, H. M.	GS-9 Entomologist (half-time)	3,340
Richards, E.	GS-9 Entomologist (half-time)	2,996
Alford, E. C.	GS-7 Entomologist	5,000
Driggs, J. M.	GS-5 Biological Aid	4,560
Kott, D. H.	WB Laborer IV	<u>1,793</u>

\$ 22,285

L/A for field tests in Kerrville area, Texas Gulf Coast, and Florida \$,000

L/A for toxicology

Effects of repeated spraying with 21/199 2,000

Development of non-irritating and safe wound dressings 1,000

6,000

Total expenditures at Kerrville \$ 30,285

Other expenditures not tabulated:

Graham, G. H., GS-12 Entomologist--Supervisory, directing Texas studies while Duchland is in Florida.

Hatcheff, R. D., GS-13 Veterinarian, ADP--Toxicology

Claborn, H. V., GS-12 Chemist--Tissue analyses and formulation of wound dressings.

Time of these men and their staffs not estimated but with 21/199 and other protectant sprays would be an important part of their program.

Also not estimated are contributions of E. C. Brummond, GS-9 entomologist--full time on systemic insecticides with at least 1/3 of effort on screw-worms.

No estimate on clerical and fiscal duties at Kerrville.

No estimate on work of ranch staff at Kerrville.

No estimate on vehicles used for field work.

No estimate on physical plant and animal maintenance overhead at Kerrville although screw-worm research would use about 1/3 of the resources of the station.

B. Biological Investigations (Orlando)

A small staff should continue basic investigations at Orlando to do research helpful to the eradication effort and carry out specialized investigations which could not be conveniently fitted into the methods development program of Animal Disease Eradication Division.

Our investigators have already put much effort into attractants studies. Incubation of meat juices produces a substance which stimulates oviposition by the laboratory strain of flies, but, so far, it has not been effective in tests with flies in nature. Chemical investigations suggest that the attractant can be concentrated. We would like to put several months of intensive work into a final effort to develop a product to attract oviposition by native flies. If this effort should be successful it would furnish a much needed tool.

An attractant would greatly simplify the problem of getting adequate samples of egg masses to appraise the effects of releasing sterilized flies. Also such an attractant might prove a much better bait for fly traps than liver which is currently used. An improved bait would add greatly to the value of fly traps for estimating screw-worm populations, especially in areas such as the everglades and off-shore islands where domestic animals are scarce, but screw-worm breeding in wildlife may produce high populations.

It is proposed that released flies be sterilized by irradiating pupae with 7,500 r (± 10 percent) of gamma-rays. Probably irradiation with 10,000 r would be no more harmful to the flies and might be desirable as an added margin of safety in the final months of the eradication campaign. Laboratory tests on the longevity of sterilized flies and the competitive mating activity of sterilized males are needed before this higher dose could be recommended for field trial in one of the release areas. A few months work would be sufficient to establish whether 10,000 r was more harmful to the flies than 7,500 r.

It is proposed that Karrville maintain its screw-worm research project at Orlando with the following estimates for staff and expenses.

WORM-WORM RESEARCH

Biological Investigations--Orlando

Graham, A. J.	GS-9 Entomologist	\$ 6,102.54
Dalley, P. H.	GS-5 Biological aid	4,706.97
Smith, Daniel	WS Laborer III	<u>2,445.15</u>
		13,274.66
Miscellaneous expenses		<u>3,000.00</u>
Total		\$ 16,274.66

Not included in these estimates are the costs of building space and utilities, automobiles, or clerical, fiscal and administrative overhead. Also no estimate is made for the chemical work which would require considerable effort from the Orlando chemistry staff working under the direction of Fred Lorce--GS-12 Chemist.

